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94-26


March 26, 1999

Mr. Dale Hatfield
Chief – Office of Engineering and Technology
Federal Communications Commission
2000 M Street, NW
Room 480
Washington, DC 20554

Re: Final Service Outage Report

Dear Mr. Hatfield:

In accordance with the requirements in CC Docket 91-273, enclosed is the Final Service Disruption Report for the Bell Atlantic service outage affecting the city of Hamburg and surrounding areas, near Buffalo, in western New York State, which occurred on February 24, 1999.

Please call me if you have any questions about this report or other service outage issues.

Sincerely,

Enclosure

cc: R. Kimball

# BELL ATLANTIC – NEW YORK
# FCC NETWORK DISRUPTION
# FINAL SERVICE DISRUPTION REPORT

This Final Service Disruption Report is filed by Bell Atlantic on behalf of its telephone operating company, Bell Atlantic-New York (BA-NY), in accordance with Section 63.100 of the Commission's Rules in the Second Report and Order in CC Docket 91-273, 9 FCC Rcd 3911 (1994), as revised by the Order on Reconsideration, released October 30, 1995, 10 FCC Rcd 11764 (1995). Bell Atlantic filed an Initial Report on February 24, 1999 notifying the Commission of an outage that occurred on that day affecting the city of Hamburg and surrounding areas, near Buffalo in western New York State.

On Wednesday, February 24, 1999, from approximately 1:00 AM to 02:22 AM, the Hamburg 5ESS switch suspended traffic on all four of its Common Channel Signaling (CCS) links. A Lucent Technologies software update, 5E11 BWM99-0001, had been installed in the Hamburg switch on Sunday, February 21, 1999. This software update included an audit that would be executed when a memory error occurred in the Common Network Interface (CNI) circuit. Apparently, early on the 24th, the CNI circuit experienced a Direct Memory Access (DMA) hardware error, which triggered this audit program. A program error within the audit suspended traffic on all four CCS links preventing Hamburg, and its eleven associated remotes, from completing interoffice calls that required CCS7 signaling.

Personnel at the Hamburg switch were initially unaware of the isolation because the hardware remained up and appeared able to support traffic. Both the Network Element Control Center (NECC) and the Albany Network Operations Center (NOC) DMS technician informed the 5ESS technician of Hamburg's isolation. The Albany NOC reinitialized Hamburg's CNI ring to restore service.

**Date of Incident:**

Wednesday, February 24, 1999

**Time of Incident:**

01:00 AM

**Duration of Outage:**

1 Hour, 22 Minutes

**Geographic Area Affected:**

Hamburg and surrounding areas in western New York State

**Estimated Number of Customers Affected:**

This outage affected approximately 77,000 access lines.

**Type of Services Affected:**

This outage affected both switched interLATA and intraLATA calls.

**Estimated Number of Blocked Calls:**

Bell Atlantic estimates there were approximately 4300 blocked calls as a result of this failure.

**Cause of the Incident, Including Name and Type of Equipment Involved and Specific Part(s) of the Network Affected:**

**Root Cause Analysis:**

Direct Cause: A DMA hardware error occurred in the CNI circuit.

Affected Element: The CCS Network Interface went out of service

Outage Cause: The cause of this outage was an error in the audit included with the software update.

Duration Cause: The following factor contributed to the duration of this outage:

- The Hamburg 5ESS switch Common Channel Signaling (CCS) links could support traffic but the switch displays did not indicate this, so the NOC forces were unable to see a problem with the links until they were contacted by the NECC.

**Root Cause Finding:**

The root cause of this outage is faulty software design. When the DMA error occurred, the software update forced the audit into a section of programming that had been omitted by the vendor.

**Methods Used to Restore Service:**

The CNI ring was manually reinitialized allowing the CCS7 links to carry traffic. After service was restored, the software update 5E11 BWM99-0001 was removed from the Hamburg 5ESS switch to ensure there would be no further service disruptions.

**Current or Proposed Company Practices Related to this Outage:**

The problem was internal to the software provided by the vendor. There is no Bell Atlantic practice that relates to this outage.

**Network Reliability Council "Best Practices" That Relate To This Incident:**

The following "Best Practice" recommended by the FCC's Network Reliability Council's publication, June 1993, *A Report to the Nation*, applies to this outage: Section c, Paragraph 5.4.3.2, "Formal design and code inspections should be performed as a part of the software development methodology."

**Describe How The NRC Recommendation(s) Could Have Prevented This Outage:**

A design review should include various module and feature combinations rigorous enough to catch any audit incompatibilities.

**Steps Taken to Prevent Recurrence:**

The Lucent Technology software update 5E11 BWM99-0001 was removed from all 53 central office switches where it had been installed. Lucent Technology has withdrawn this software nationwide and has issued a correcting software update 5E11 BWM99-A001.